

## WHAT IS CLAIMED IS:

1. A process of preparing gold-coated magnetic nanoparticles comprising:  
forming a suspension of magnetic nanoparticles within a suitable liquid;  
adding an amount of a reducible gold compound and a reducing agent to the  
suspension; and,  
5 maintaining the suspension for time sufficient to form gold-coated magnetic  
nanoparticles.
2. The process of claim 1 wherein said magnetic nanoparticles are of a magnetic  
material selected from the group consisting of the elements cobalt, iron, nickel,  
samarium, neodymium, platinum, boron, compounds thereof and alloys thereof.
3. The process of claim 1 wherein said magnetic nanoparticles are of samarium  
cobalt.
4. The process of claim 1 wherein said reducible gold compound is selected from the  
group consisting of sodium tetrachloroaurate, sodium tetrabromoaurate, tetrachloroauric  
acid, tetrabromoauric acid, potassium tetrachloroaurate, and potassium tetrabromoaurate.
5. The process of claim 1 wherein said reducing agent is selected from the group  
consisting of sodium citrate, sodium borohydride, white phosphorus, lithium aluminum  
hydride, and sodium cyanoborohydride.
6. The process of claim 1 further including reacting said gold-coated magnetic  
nanoparticles with a mercapto-terminated bifunctional compound to form composite  
nanoparticles of a thiol-bound functional group-containing spacer group thereon said  
gold-coated magnetic nanoparticles.
7. The process of claim 6 further including reacting said functional group upon  
said composite nanoparticles with a linker group having one terminally protected  
functionality.
8. The process of claim 6 wherein said mercapto-terminated bifunctional  
compound includes as a functionality selected from the group consisting of carboxylic  
acid, amine, sulfhydryl, phosphate, phosphonate hydroxyl, alkenyl, and alkyne.

9. The process of claim 7 wherein said linker group having one terminally protected functionality is selected from the group consisting of Fmoc-ethylenediamine, ethylene glycols, propylene glycols, cysteamines and homologues thereof.

10. The process of claim 7 wherein said linker group having one terminally protected functionality is Fmoc-ethylenediamine.

11. The process of claim 6 further including de-protecting the one terminally protected functionality and reacting said functionality with a recognition group, a bioconjugative reactive moiety or a biologically active moiety.

12. A gold-coated magnetic nanoparticle composite comprising:  
a magnetic nanoparticle central core; and,  
a coating of gold completely encapsulating said magnetic nanoparticle central core.

13. The composite of claim 12 wherein said magnetic nanoparticles are of a magnetic material selected from the group consisting of the elements cobalt, iron, nickel, samarium, neodymium, platinum, boron, compounds thereof and alloys thereof.

14. The composite of claim 12 wherein said magnetic nanoparticles are of samarium cobalt.

15. The composite of claim 12 further including thiol-bound functional group-containing spacer groups thereon said gold-coated magnetic nanoparticles.

16. The composite of claim 15 further including linker groups bound at one end with said thiol-bound functional group-containing spacer groups thereon said gold-coated magnetic nanoparticles, said linker groups also having one terminally protected functionality.